

# Sound Sandwich (aka Craft Stick Harmonica)

Make beautiful music with sticks, straws, and rubber bands

By making simple adjustments to this noisemaker, you'll be able to raise or lower its pitch and make different kinds of sounds.



## Tools and Materials

- Two jumbo craft sticks
- Regular drinking straw
- Wide rubber band (#64 size)
- Two smaller, narrower rubber bands
- Scissors (not shown)



## Assembly

1. Stretch a wide rubber band lengthwise over one of the craft sticks.
2. Cut two small pieces of straw, each about 1 inch to 1 1/2 inches (2.5 to 3.8 cm) in length. Put one of the small straw pieces under the wide rubber band, about a third of the way up from one end of the stick. Put the other piece of straw on top of the rubber band, about a third of the way from the other end of the stick (click to enlarge photo below).



3. Take the second craft stick and place it on top of the first one.
4. Wrap one of the smaller rubber bands a few times around the end of the stick where you placed the second piece of straw, about 1/2 inch (1.25 cm) from the end. Make sure the rubber band pinches the two sticks tightly together.
5. Wrap the second small rubber band around the other end of the stick, about 1/2 inch (1.25 cm) from the end. When you're done, both ends should be pinched together and there should be a small space between the two craft sticks, created by the pieces of straw. (Click to enlarge the cross-section diagram below.)



### To Do and Notice

When your Sound Sandwich is complete, just put your mouth in the middle, as if you were playing a harmonica, and blow! (Remember to blow through the sticks, not the straws.) Notice that you can make different sounds by blowing through different areas of the instrument, blowing harder or softer, or by moving the straws closer together or farther apart. Experiment to find out how many different sounds the Sound Sandwich will make.

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### What's Going On?

When you blow into the Sound Sandwich, you make the large rubber band vibrate, and that vibration produces sound. Long, massive objects vibrate slowly and produce low-pitched sounds; shorter, less-massive objects vibrate quickly and produce high-pitched sounds. The tension of a rubber band also will change its pitch: Higher tensions lead to higher-pitched resonances. When you move the straws closer together, you shorten the part of the rubber band that can vibrate, so the pitch gets higher than the original sound. You may also have played with this effect if you've ever stretched a blade of grass between your fingers and blown on it to make the grass vibrate and buzz.

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### Going Further

Like the rubber band in the Sound Sandwich, your vocal cords also vibrate when you speak or sing. The more tension they're under, the faster they vibrate and the higher the sound they make.

*Format for instructions found and modified from the Exploratorium website, <https://www.exploratorium.edu/snacks/sound-sandwich>. The Exploratorium is a public learning laboratory exploring the world through science, art, and human perception and located in San Francisco.*